CLAIMS

1. A tomographic device, which comprises a detecting means which is constituted by arranging a plurality of detector elements in 2- dimension and detects X-rays irradiated to a subject and penetrated through the subject, means for producing the detected data as projection data, a projection data memory means which stores the produced projection data, means for dividing an image reconstruction area having a predetermined size corresponding to a region of interest of the subject into image data segments having an arbitrary size and an image reconstruction computing means which performs an image reconstruction computing on the divided image data segment regions from the projection data and generates a 3-dimensional tomographic image, wherein the image reconstruction computing means includes an extracting means which extracts from the projection data the projection data segment region necessary for generating the 3-dimensional tomographic image of the image data segment regions, a projection data segment region memory means which stores the extracted projection data segment regions and a 3 dimensional back projection processing means which successively reads out the projection data segment regions stored in the projection data segment region memory means and performs 3-dimensional back projection processing for

every respective corresponding image data segments.

2. A tomographic device according to claim 1,wherein the processing speed of projection data segment region memory means is higher than that of the projection data memory means.

3. A tomographic device according to claim 1 or 2,wherein the extracting means includes means for calculating addresses on the detecting means of the X-rays passing through representative points of the divided regions based on a predetermined addressing method and means for determining a position on the detecting means of the penetrating rays passing through a point other than the representative points through interpolation based on the calculated positions of the representative points.

4. A tomographic device according to one of claims 1 through 3, wherein the 3-dimensional back projection processing performed by the 3-dimensional back projection processing means is executed by storing successively the data of the extracted projection data segment regions into the projection data segment region memory means.

5. A tomographic device according to claim 3,wherein the extracting means includes means for calculating addresses on the detecting means of the penetrating rays passing through a plurality of corner points of the image data segment regions based on a

predetermined addressing method, means for calculating the maximum value and the minimum value in channel direction and row direction among the addresses on the detecting means calculated with regard to the plurality of the corner points, means for calculating a size of the projection data segment from the calculated maximum value and the minimum value and means for calculating a reference address serving as a reference for the projection data segment from the calculated maximum value and the minimum value, and through these means the extraction of the projection data segment regions is performed.

6. A tomographic device, which comprises a detecting means which is constituted by arranging a plurality of detector elements in 2- dimension and detects X-rays irradiated to a subject and penetrated through the subject, means for producing the detected data as projection data, a projection data memory means which stores the produced projection data, means for dividing an image reconstruction area corresponding to a region of interest of the subject into image data segments having an arbitrary size and an image reconstruction computing means which performs an image reconstruction computing on the divided image data segment regions from the projection data and generates a 3-dimensional tomographic image, which further comprises an input means which inputs externally the

size of the image reconstruction area to be divided by the dividing means, a display means which displays the projection data together with the position of the divided image data segments and a selecting means which selects externally an arbitrary image data segment region from the projection data displayed together with the position of the image data segments, wherein the image reconstruction computing means includes an extracting means which extracts from the projection data the projection data segment region necessary for generating the 3-dimensional tomographic image of the selected image data segment regions, a projection data segment region memory means which stores the extracted projection data segment regions and a 3 dimensional back projection processing means which successively reads out the projection data segment regions stored in the projection data segment region memory means and performs 3-dimensional back projection processing for every respective corresponding image data segments.

7. A tomographic method comprising the steps of:

detecting X-rays irradiated to a subject and penetrated through the subject by a detecting means which is constituted by arranging a plurality of detector elements in 2- dimension and producing the detected data as projection data,

storing the produced projection data by a projection data memory means,

dividing an image reconstruction area corresponding to a region of interest of the subject into image data segments having an arbitrary size and

performing an image reconstruction computing by an image reconstruction computing means on the divided image data segment regions from the projection data and generating a 3-dimensional tomographic image,

further comprising inputting externally the size of the image reconstruction area to be divided in the dividing step,

displaying the projection data together with the position of the divided image data segments,

selecting externally an arbitrary image data segment region from the projection data displayed together with the position of the image data segments,

extracting from the projection data the projection data segment region necessary for generating the 3-dimensional tomographic image of the selected image data segment regions through the image reconstruction computing means,

storing in a projection data segment region memory means the extracted projection data segment regions and

performing 3-dimensional back projection processing for every projection data segment regions stored in a projection data segment region memory means.

8. A tomographic deice, in which penetration rays

penetrated through a subject are detected by a detecting means constituted by arranging a plurality of detection elements in 2-dimension, image reconstruction computing is performed by an image reconstruction computing means on an image reconstruction area corresponding to a region of interest of the subject based on the detected projection data and a 3-dimensional tomographic image of the region of interest of the subject is generated, wherein the image reconstruction computing means includes a processing means which divides the image reconstruction area into a plurality of image data segment regions, cuts out from the projection data detected by the detection means a projection data segment region necessary for back projecting toward the respective divided image data segment regions and performs a 3-dimensional back projection processing for every respective corresponding image data segment regions by making use of the data of the respective cut out projection data segment regions.

9. A tomographic device according to claim 8, the processing means calculates addresses on detecting means of the projection data to be back projected from the respective projection data segment regions to the respective corresponding image data segment regions according to a predetermined addressing formula for a plurality of representative reconstruction points in

the respective image data segment regions and calculates addresses approximately through an interpolation for the remaining reconstruction points based on the calculated addresses on the detecting means of the plurality of the representative reconstruction points.

10. A tomographic device according to claim 8, the 3-dimensional back projection processing performed by the processing means for the respective image data segment regions is performed by storing successively the data of the respective data segment regions and the data of the corresponding cut out projection data segment regions in a high speed memory in the image reconstruction computing means.

11. A tomographic device according to claim 8, the cut out of the projection data segments corresponding to the respective image data segment regions by the processing means is performed based on the calculation of the addresses on the detecting means of the projection data corresponding to corner points of the respective projection data segment regions based on a predetermined addressing formula, the calculation of the maximum value and the minimum value among the calculated addresses on the detecting means and the calculation of a size of the projection data segments and of a reference address on the projection data segments from the calculated maximum value and minimum

value of the addresses on the detecting means.